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Improved Primer for Bonding Polyurethane Adhesives to Metals

A primer has been developed to ensure effective bonding integrity of polyurethane adhesives on metal surfaces at temperatures ranging from -423° to $+120^{\circ}$ F. The primer-adhesive system provides greater metal surface protection and bond strengths over this temperature range than could be attained with other adhesive systems. Use of this primer also reduces gas permeability and provides a film of lower surface tension which facilitates adhesive application. The primer can be directly sprayed or brushed on clean metal surfaces.

The primer, a modified polyester/isocyanate, is prepared from a commercially available polyester resin and a trifunctional polyisocyanate (e.g., polymethylene polyphenylisocyanate). To produce the primer, the polyester resin is dissolved in a chlorinated hydrocarbon (e.g., 1, 1, 2-trichloroethane), and the polyisocyanate is added to the solution. The ratio of the reactants in parts by weight is 80 of polyester plus solvent (7-8 percent solids) to 1 of the polyisocyanate. When catalyzed, the mixture has a shelf life of more than 8 hours at room temperature. The mixture can be cured within 4 hours at room temperature or within 2 hours at room temperature (setup) plus 2 hours at

150° to 180° F. The mix ratio of resins to catalysts can be varied, depending on the resin content of the uncured mixture, to provide primer coatings with varying degrees of toughness or flexibility and environmental resistance for use with polyurethane adhesives over the indicated temperature range.

Note:

Documentation is available from:

Technology Utilization Officer
Marshall Space Flight Center
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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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